he has failed to find a single one without living tenants. These larvae have been reared and studied by MEIJERE,[20] who describes 7 species, of which 6 are new. They are to be referred to the order Diptera, and belong to three different families.

Not the least remarkable characteristic of these larvae is the power they seem to possess of anti-fermentation, and which appears to retard the action of the enzymes of the fluid filling the pitchers. Experiments upon their influence upon the action of solutions of pepsin and pancreatin furnish evidence of their retarding influence. Closely related larvae, taken from pools in the vicinity, were unable to live in the pitchers; hence the anti-ferment is regarded as an adaptation to such symbiotic existence.—GEO D. FULLER.

Grape mildew.—A number of infection experiments, bringing out some of the relations between the downy mildew of the grape and its host, have been described by MÜLLER-THURGAU.[21] Pot-grown grapevines were brought into a greenhouse, and only the new shoots that developed under glass were used for the experiments. The infected shoots were covered for a time with glass cases, to prevent too rapid evaporation of the drops of water containing the spores used for inoculation. The main results of the experiments are the following: No infection took place on the upper surface of the leaves unless punctures had been made in the epidermis. Infections took place readily on the lower surface if the plants were kept in a moist atmosphere. The very youngest leaves were not readily infected, a fact which the author attributes to causes within the leaf rather than to such outer factors as the dense hairy covering. Leaves a little older are most easily infected and in these the fungus grows a long time and forms spots of considerable size before the infected area dies. On the older leaves the action of the fungus is more severe. The infected spots remain small, usually 3–5 mm. in diameter, but the tissue within these spots is killed immediately. In these small spots large numbers of oospores are found. The difference in behavior of leaves of different ages is attributed to differences in moisture content or to differences in composition. —H. HASSELBRING.

Egg-formation in Cystosira and Sargassum.—NIENBURG[22] reports the result of his investigation on the development of the eggs of *Cystosira* and *Sargassum*. *Cystosira barbata* Ag. was collected at Naples in the spring of 1907, and *Sargassum linifolium* was obtained from Triest in September of the following year. The paper presents briefly the nuclear divisions in the oogonium of *Cystosira* and the development of sporelings of *Sargassum*. The author

[20] MEIJERE, J. C. H. DE, *Nepenthes*-Tiere. I. Systematik. Ann. Jard. Bot. Buitenzorg Suppl. 3. pt. 2. 917–940. 1910.

[21] MÜLLER-THURGAU, H., Infection der Weinrebe durch *Plasmopara viticola*. Centralbl. Bakt. II. **29**:683–695. *fig. 1.* 1911.

[22] NIENBURG, WILHELM, Die Oogonentwicklung bei *Cystosira* and *Sargassum*. Flora **1**:167–180. *pls. 1, 2. figs. 9.* 1910.

followed the nucleus in the oogonium of *Cystosira* from the young resting stage to synapsis, metaphase of the first division, and second and third divisions. The number of chromosomes in the first division he reports to be 18–20. He compares the figures of the first division with those of vegetative divisions, and because of the appearance of a much higher number of chromosomes in the vegetative figures, he infers that 18–20 is the reduced number. Further, upon comparison with the case of *Fucus*, he infers that the oogonium of *Cystosira* and *Sargassum* may represent the x-generation. The development of the sporelings of *Sargassum* is discussed in comparison with SIMONS' work on another species of the same genus. The reviewer thinks that it is very desirable to have more detailed accounts of the events occurring in the oogonium of these forms and of the processes connected with the development of a normally fertilized or a parthenogenetic egg.—S. YAMANOUCHI.

Spermatogenesis in liverworts.—WOODBURN,[23] while studying spermatogenesis in *Porella*, traversed the work of IKENO, ESCOYEZ, and SCHAFFNER in *Marchantia polymorpha* and that of BOLLETER in *Fegatella conica* for evidences of centrosomes. In none of the forms studied did he find any evidence of centrosomes. Although occasional granules were found in the cytoplasm, or in the region of the spindle, they did not present the appearance of or behave like centrosomes. He concludes that if a body does sometimes occupy the pole of a spindle it does not imply that it is any more a centrosome than the other bodies scattered through the cytoplasm. He says that the blepharoplast develops *de novo* from a dense granular or spherical mass, kinoplasmic in origin, located usually at the most distant angle of the spermatid. The blepharoplast becomes a cord, growing in close contact with the plasma membrane. He thinks the "cytoplasmatischer Fortsatz" of IKENO is merely a part of the blepharoplast. Nothing whatever corresponding to a "Nebenkörper" was found. He concludes that the sperm at maturity represents the two constant cell elements, nucleus and cytoplasm; that the main body of the cell represents the nucleus; that the blepharoplast and cilia represent specialized cytoplasm; and that the remainder of the cytoplasm is found in the vesicle.—W. J. G. LAND.

Records of Oenothera.—GATES[24] has undertaken to trace the history of species of *Oenothera* in cultivation, particularly the large-flowered forms. This involved a critical examination of the records through three centuries, beginning with TOURNEFORT'S *Institutiones*. The pertinent evidence is recited from the documents in detail, and the conclusion reached that "a form closely resembling *O. Lamarckiana* was the first *Oenothera* introduced into Europe

[23] WOODBURN, W. L., Spermatogenesis in certain Hepaticae. Ann. Botany **25**: 299–313. *pl. 1.* 1911.

[24] GATES, R. R., Early historico-botanical records of the Oenotheras. Proc. Iowa Acad. Sci. **17**:85–124. *pls. 6.* 1910.